

Acknowledgement

It gives me immense pleasure and satisfaction in commemorating all the helping hands who have contributed significantly to make this work see light of the day. I am deeply indebted to my Ph.D. supervisor **Prof. Prafulla K. Jha** for introducing me to the fantastic world of research in condensed matter physics. His active and insatiable attitude for research in new technological fronts have significantly motivated me and developed real insight and aptitude for research. He has guided and provided me a true platform to reach a place where I am capable of writing a Ph.D. thesis.

I am deeply grateful to **Dr. Vasant Sathe**, UGC-DAE CSR, Indore for his precious guidance for explaining to me about the Raman Spectroscopy measurement and related aspects of work. I am thankful to **Dr. Mukul Gupta**, UGC-DAE CSR, Indore for providing continuous support to use the XRD instrument at his laboratory. I also extend my heartfelt thanks to XRD lab colleagues for their help in taking XRD measurements. I am greatly thankful to **Dr. P. D. Babu**, UGC-DAE CSR, Mumbai for providing PPMS measurements in his Lab. I would also like to thank **Dr. Sanjeev Kane**, RRCAT, Indore for providing beamline for XPS measurement.

I express my thankfulness to the heads of the department for availing all the departmental facilities during my Ph.D. course. I am extremely thankful to **Prof. P. K. Mehta** and **Prof. Prasanna Ghalsasi** for providing continuous use of the Furnace oven in their lab. I am thankful to **Dr. Mehul Patel** providing TGA facility at GIRIDA, The M. S. University of Baroda, Vadodara. I am also thankful to **Sprint Testing Solution**, Powai, Mumbai for providing many required measurements facilities in short time period.

I would like to thank my seniors and lab mates for providing valuable suggestions throughout the Ph.D. work. It is great moment to remember my friends ***Mrs. Shesha Patel, Ms. Sitara Menon, Mrs. Mahatta Oza*** and ***Ms. Khushbu Gohel*** for their valuable support during the tough and good times of this memorable journey.

It is a great moment to remember my family members for their persistent efforts for developing my educational career and personality since my childhood. I would like to express the heartiest gratitude to my loving parents ***Mr. Mukeshkumar B. Astik*** and ***Mrs. Jyotiben M. Astik***, who have been source of encouragement for me throughout this journey. My mother has been a strong force to inhibit strength and toughness in me and my father had sacrificed the joys of life to see me achieving this milestone. I would like to extend my thankfulness to my beloved brother ***Mr. Krunal M. Astik*** and my sister ***Ms. Komal M. Astik*** for being always with me in all the good and bad times and helping me to make this work possible with the love. Finally, I would like to thank my mother-in-law, ***Dr. Anjani***, my brother-in-law, ***Mr. Aditya*** and my sister-in-law, ***Mrs. Ashita*** for their love and support.

Last but not least, I have no words to express my feelings for my husband ***Mr. Deekshant Tiwari*** who not only helped me during writing stage of my thesis but also respected my wish to complete my research work without any break.

I sincerely acknowledge all my well-wishers who directly or indirectly helped me during the course of this work. Finally, I sincerely acknowledge all my teachers who have laid an educational foundation in my career during early stages of my education.

I sincerely acknowledge the University Grants Commission, New Delhi for providing financial support in terms of project assistant-ship and BSR- Fellowship.